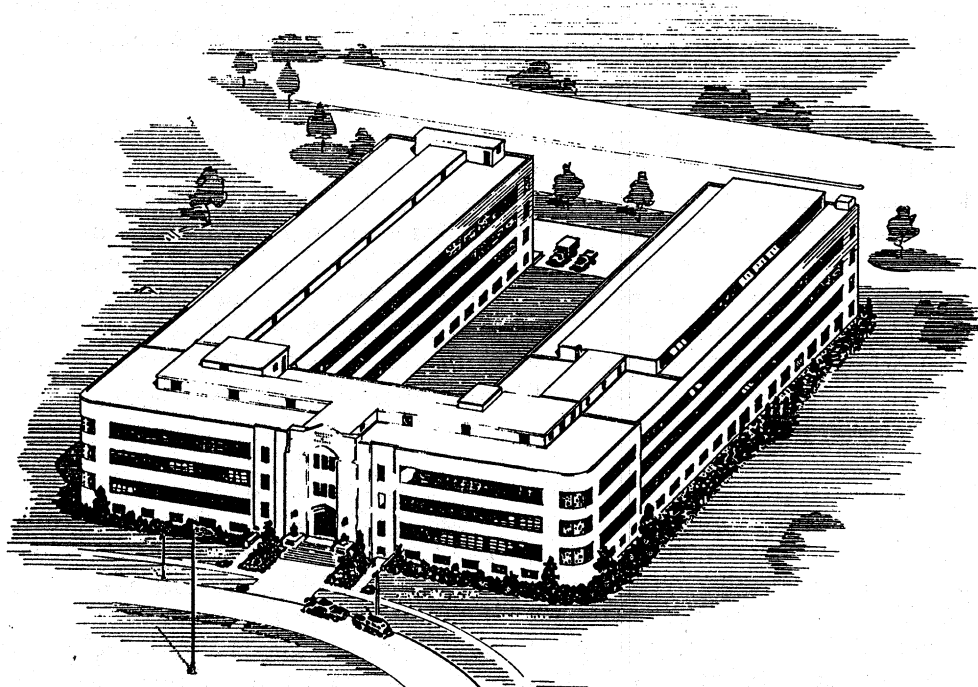


446

MAPLE SIRUP. II. A NEW HIGH-FLAVORED MAPLE SIRUP

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In a previous publication² outlining research on maple products in progress at this Laboratory and discussing some of the problems of the maple industry, emphasis was given to the problem of flavor. Our preliminary fundamental investigations on this problem have led to the development of a new maple product--a maple sirup of much stronger maple flavor. The purpose of the present publication is to describe the process for making this product.

The principal observations which contributed to this development are briefly: (a) maple sap as it comes from the tree is devoid of maple flavor and color; (b) a sirup of normal flavor and color is readily prepared from this sap by atmospheric evaporation at the usual processing temperatures (216 to 221° F.); (c) a sirup entirely free of flavor and color was prepared from this sap by freeze-drying; (d) maple flavor and color could be developed in the latter sirup by subsequent heating; and (e) additional maple flavor and color could be developed in a conventionally prepared maple sirup by subsequent heating.

In connection with the latter observation, the amount of additional flavor and color developed was dependent on the temperature, time, and conditions of the subsequent heating. Preliminary tests indicated that if this heating is done at 225° F. or above in the presence of as much as 35 percent water (the normal water content of standard maple sirup), caramel and other off-flavors are present to such an extent that the additional maple flavor produced is largely masked. This is apparently not the case when lesser amounts of water are present during the high temperature heating process, since the additional maple flavor developed exceeds in amount the off-flavors present.

Based upon these observations a new process has been devised for making a maple sirup greatly enriched in maple flavor. The strength of the maple flavor in the resulting sirup is four- to six-fold that of the original sirup. The process for making this high-flavored maple sirup consists of (a) boiling the sirup at atmospheric pressure until sufficient water has been removed to cause the boiling point of the thickened sirup (solids increased to approximately 90%) to be raised to a temperature between 240° F. and 255° F.; (b) holding it for approximately two hours at this elevated temperature by preventing further loss of water through the use of a reflux condenser; (c) cooling and adding an amount of water equivalent to that lost by evaporation. Sirup so treated develops an intensity of color and a strength of maple flavor that is at least four-fold in respect to the starting sirup. One part of this product can therefore be diluted with three or more parts of cane sugar sirup (65 percent solids) to yield a maple-cane sirup blend that is practically indistinguishable from the original sirup.

¹ REPORT OF A STUDY MADE UNDER THE RESEARCH AND MARKETING ACT OF 1946.

² C. O. WILLITS AND W. L. PORTER, U. S. DEPT. OF AGRIC. (EASTERN REGIONAL RESEARCH LABORATORY) AIC-268, 1950, 'MAPLE SIRUP. I. RESEARCH PROGRAM ON MAPLE PRODUCTS AT THE EASTERN REGIONAL RESEARCH LABORATORY.'

This high-flavored sirup can be made from all of the different grades of maple sirups, defined by the "U. S. Standards for Table Maple Sirup"³ or the "U. S. Standards for Maple Sirup for Reprocessing"⁴, or from any mixture of these.

The process, as outlined, is simple and requires no special equipment since all that is necessary is a steam-jacketed sugar kettle equipped with stirrer, and a lid fitted with a long upright pipe to serve as a reflux condenser.

Blending of Maple Sirup

One of the ways to increase the demand for maple sirup is to develop a suitable blending procedure that yields a good low cost product that will both develop and hold the market. Maple sirup that is not sold directly to the consumer by the farmer-producer is sold at wholesale (drum trade) to the large processors. Here the sirup is diverted into two principal channels, as table sirup and as an ingredient in tobacco manufacture. The latter has become less important because of the current high costs of domestic maple sirup. This high cost has also been responsible for an almost complete stoppage of the making of a mixed, uniformly colored, pure table maple sirup. Instead almost all of the maple crop sold wholesale is being made into a maple sirup blend, so called because the pure maple sirup is blended with a cheaper sirup of either cane or corn sugars.

To permit the dilution of one part of maple sirup with several parts of a colorless and flavorless sugar sirup requires a maple sirup sufficiently strong so that the blend (diluted product) will still resemble the original in color and flavor. The large processors have accomplished this by mixing the strong dark grades of maple sirup with the lighter, more truly maple-flavored, better grades to obtain one with a color and flavor that can be diluted four to six times. Unfortunately, since this kind of blending depends to a large extent upon the use of the lower grades of maple sirup which are loaded with caramel and other non-maple flavors, it carries these off-flavors into the blend. On the other hand blending, which must not be confused with adulteration, has (a) produced a low-priced table sirup containing a true, if inferior, maple flavor and (b) has opened up vast new markets for the maple crop.

During the past season many areas produced largely "Fancy" or "No. 1" sirup, both of which are too light and too delicately flavored to permit blending (diluting).

The blends made from the new high-flavored maple sirup are equal to and often better in flavor than the original maple sirup from which the highly

³ UNITED STATES STANDARDS FOR TABLE MAPLE SIRUP. PRODUCTION AND MARKETING ADMINISTRATION. U. S. DEPARTMENT OF AGRICULTURE. ISSUED FEBRUARY 7, 1940.

⁴ UNITED STATES STANDARDS FOR MAPLE SIRUP FOR REPROCESSING. PRODUCTION AND MARKETING ADMINISTRATION. ISSUED FEBRUARY 7, 1940.

flavored product was made, since in the new process only maple flavor and color are developed with little or no caramel or other off-flavors. Thus the resulting blended sirup will be rich in maple flavor and in color, and the off-flavors present in the original sirup will be diluted to an unobjectionable level. In tests comparing the original maple sirup with the blend made from the high-flavored maple sirup, many have been unable to distinguish them and others have found the blend superior.

In addition to yielding a better blended sirup than has been possible heretofore, the new process provides a means of more fully utilizing the high, more delicately flavored, grades of sirup. Sirups designated as Fancy Maple Sirup or No. 1 Sirup can now fully justify the term "quality or premium sirups" which has so often been applied to them, since the high-flavored sirup or sugar made from them will have flavor almost exclusively maple. This is possible since the original Fancy or No. 1 sirups are essentially free of off-flavors and so will not contribute any of these to the high-flavored maple sirup or to blends made from them. The use of the high-flavored maple sirup made from any or all of the sirup grades will permit the production of a blended product which can be maintained at a closely controlled level of flavor and color irrespective of the sirup grades produced in a season's crop. However a higher quality blend can be made if only the better grades of sirup which are essentially free of off-flavors are used as starting materials.

There need be no fear that such a process, which permits getting four or more gallons of sirup to one, will harm the industry. Actually the blending that is now being done, even with its off-flavors, has demonstrated that, in producing a sirup containing true maple flavor at a price that can be afforded by a large majority of the people, vast untapped markets have been opened up and indications are that the demand has greatly exceeded the supply.

The process described here for making a maple sirup of enhanced maple flavor was so recently developed at this Laboratory that there has not yet been an opportunity to evaluate it commercially, but no difficulties are anticipated in its adaptation. For the protection of our maple producers an application for a public service patent of this process has been filed.

This new highly flavored maple product, in addition to its use in blending maple-cane sirups, should prove useful as a flavor for ice cream, sherbets, candies, baked goods and other foods.